wherein any (C_1-C_{20})alkyl, (C_3-C_8)cycloalkyl, (C_2-C_{20})alkenyl, or (C_2-C_{20})alkynyl of R_5 or R_6 is optionally substituted with one or more halo, hydroxy, mercapto, oxo, thioxo, carboxy, (C_1-C_{20})alkanoyl, (C_1-C_{20})alkoxycarbonyl, aryl, heteroaryl, or NR_kR_m;

wherein R_k and R_m are each independently hydrogen, (C_1-C_{20})alkyl, (C_3-C_8)cycloalkyl,(C_2-C_{20})alkenyl, (C_2-C_{20})alkynyl, (C_1-C_{20})alkanoyl, (C_1-C_{20})alkoxycarbonyl, aryl, or heteroaryl; and

wherein any aryl or heteroaryl is optionally substituted with one or more halo, mercapto, hydroxy, oxo, carboxy, cyano, nitro, trifluoromethyl, trifluoromethoxy, (C_1-C_{20})alkanoyl, (C_1-C_{20})alkanoyloxy, sulfo or (C_1-C_{20})alkoxycarbonyl; or a salt thereof.

74. (NEW) The kit of any one of claims 22, 23, 24, and 49 wherein the organic compound is a compound of any one of formulae 1-11 as shown in Figure 4.

75. (NEW) The kit of any one of claims 22, 23, 24, and 49 wherein the organic compound is a compound of formula 1, 2, 4, or 6 as shown in Figure 4.

The above amendments do not add new matter to the application.

REMARKS

Claims 1-34 were pending; claims 1, 3, and 15 have been amended; and new claims 35-75 have been added. Thus, claims 1-75 are pending.

Claims 1-34 were rejected under 35 U.S.C. § 112, second paragraph, as being indefinite. This rejection is respectfully traversed.

The Examiner stated that the term "organic compound" is indefinite. Applicant respectfully submits that the meaning of the term "organic compound" would be clear to one skilled in the art. Additionally, at page 10, line 11 of the specification, an organic compound is defined as a compound that "comprises one or more carbon atoms." This definition is believed to be well recognized in the art. The specification also identifies numerous examples of organic compounds (see for example page 9, line 27 to page 15, line 20; and the experimental data

provided at pages 18-34). Because the term organic compound is well understood in the art, and because of the extensive guidance provided in the specification regarding the meaning of this term, Applicant respectfully submits that one skilled in the art can readily identify an organic compound. Thus, the term "organic compound" is not indefinite.

The Examiner also stated that the claims were indefinite because they failed to recite concentration for the organic compound. It is respectfully pointed out that the claims recite that the compound reduces a specified luminesence by at least about 10 fold. Thus, the claims recite a functional amount of the compound. Additionally, the Examiner's attention is called to the specification at page 16, lines 7-20, where considerable guidance is provided regarding possible concentrations for the organic compound. In light of the guidance provided in the specification (including the extensive working examples), and the functional language included in the claim, it is respectfully submitted that the claims meet the requirements of §112, second paragraph.

In light of the above remarks, the Examiner is respectfully requested to withdraw the rejection of the claims under 35 U.S.C. § 112, second paragraph.

Claims 1-3, 8-12 and 16-21 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Mitoma et al. (JP07067696A). This rejection is respectfully traversed.

Mitoma discusses a method of reducing background luminescence in a mixture where luminescence is generated by the treatment of a 2,3,-dihydro-1,4-phthalazinedione with heme or peroxidase, in the presence of an oxidizing agent.

Independent claims 1, 3, and 35 are directed to a method for increasing the sensitivity of a bio-luminescent assay (i.e. an assay wherein light is generated through the action of an enzyme). Independent claim 2 is directed to a method for increasing the sensitivity of a luminescent assay wherein luminescence is generated by luminogenic molecules bound to an enzyme. Independent claims 22-24 and 49 are directed to assay kits that comprise "a luminogenic substrate of a luminescent enzyme, or a luminogenic enzyme."

The Examiner bears the initial burden of factually supporting any *prima facie* conclusion of obviousness. To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves, or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to

combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all of the claim limitations. M.P.E.P. §2142.

Mitoma discusses a method of reducing background luminescence in a mixture where luminescence is generated by treating 2,3,-dihydro-1,4-phthalazinedione with an oxidizing agent. Mitoma does not suggest any method for increasing the sensitivity of a luminescent assay wherein luminescence is generated by the action of an enzyme on a substrate. Thus, Mitoma would not have suggested the claimed invention to one skilled in the art.

Additionally, Mitoma would not have provided one skilled in the art with a reasonable expectation that the sensitivity of a luminescent assay, wherein luminescence is generated by the action of an enzyme on a substrate, would be increased by the presence of a compound of formula I-IV as described in Mitoma. The mechanism of the luminescent reaction discussed in Mitoma differs significantly from the mechanism of the luminescent reactions recited in the instant claims. Thus, Mitoma would not have provided one skilled in the art with a reasonable expectation that the compounds of formula I-IV described therein would increase the sensitivity of the luminescent reactions as recited in the instant claims.

In light of the above remarks, it is respectfully submitted that the instant claims are not *prima facie* obvious over the disclosure of Mitoma.

Claims 1-3, 8-31 and 34 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Kricka (U.S. Patent No. 5,629,168). This rejection is respectfully traversed.

Kricka discusses a method for increasing the light output and/or the signal-to-background ratio of light output from a chemiluminescent reaction of dihydrophthalazinedione, a peroxidase enzyme catalyst and an oxidant, by carrying out the reaction in the presence of an enhanser which is an aromatic organo boron compound.

Like Mitoma, Kricka does not suggest any method for increasing the sensitivity of a luminescent assay wherein luminescence is generated by the action of an enzyme on a substrate.

Additionally, Kricka would not have provided one skilled in the art with a reasonable expectation that the sensitivity of a luminescent assay, wherein luminescence is generated by the action of an enzyme on a substrate, would be increased by the presence of an organo boron

compound as described therein, because the mechanism of the luminescent reaction discussed in Kricka differs significantly from the mechanism of the luminescent reactions recited in the instant claims. Thus, Kricka would not have provided one skilled in the art with a reasonable expectation that the organo boron compounds described therein would increase the sensitivity of the luminescent reactions as recited in the instant claims.

In light of the above remarks, it is respectfully submitted that the instant claims are not *prima facie* obvious over the disclosure of Kricka.

Claims 1-34 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Wood (U.S. Patent No. 5,814,471). This rejection is respectfully traversed.

Wood '417 discloses a method for improving the kinetics of light production from luciferase activity.

The instant claims are directed to a method (and kits) for increasing the sensitivity of a luminescent assay by reducing unwanted luminescence by at least about 10 fold.

It is respectfully submitted that Wood does not suggest that unwanted luminescence can be reduced in any way. Additionally, Wood provides no expectation that unwanted luminescence can be reduced using the method reported therein. Thus, the instant claims are not *prima facie* obvious over the disclosure of Wood.

At page 5 of the Office Action, the Examiner admits that Wood does not disclose the reduction of unwanted luminescence. Despite this acknowledgment, the Examiner goes on to state that it would have been obvious to one skilled in the art to have utilized thiol reagents to increase assay sensitivity. Even if the Examiner's statement were true, *arguendo*, it is respectfully submitted that it would not establish a *prima facie* case of obviousness for the instant claims. The instant claims recite an organic compound that reduces unwanted luminescence. Nothing in Wood suggests that unwanted luminescence can be reduced. Additionally, nothing in Wood suggests how one skilled in the art could have achieved this result. Thus, the instant claims are not *prima facie* obvious over the disclosure of Wood.

In light of the above remarks, the Examiner is respectfully requested to withdraw the rejections under 35 U.S.C. § 103(a).

Applicant respectfully submits that the claims (1-75) are in condition for allowance and notification to that effect is earnestly requested. The Examiner is invited to telephone Applicant's attorney to facilitate prosecution of this application.

If necessary, please charge any additional fees or credit overpayment to Deposit Account No. 19-0743.

Respectfully submitted,

ERIKA HAWKINS ET AL.,

By their Representatives,

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Date 08/24/01 By _____
Robert J. Harris, Ph.D.
Reg. No. 37,346

CERTIFICATE UNDER 37 CFR 1.8: The undersigned hereby certifies that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail, in an envelope addressed to: Commissioner of Patents, Washington, D.C. 20231, on this 27 day of August, 2001.

Kandi Lortie
Name

Kandi Lortie
Signature

CLEAN VERSION OF PAGE 25, TABLE 1, LAST FIVE ENTRIES

METHOD FOR INCREASING BIOLUMINESCENT ASSAY SENSITIVITY

Applicant: Erika Hawkins et al.

Serial No.: 09/590,884

9	30	B4	2.5	No effect
9	100	B4	3	Increased 4.7 fold
11	30	B3	2	No Effect
11	30	B4	2.3	Increased 1.5 fold
11	100	B4	3.7	Increased 1.8 fold

Docket No. 00341.014US1
WD #

Clean Version of Pending Claims

METHOD FOR INCREASING LUMINESCENCE ASSAY SENSITIVITY
Applicant: Erika Hawkins et al.
Serial No.: 09/590,884

1. (Amended) A method for increasing the sensitivity of a bio-luminescent assay comprising carrying out the assay in the presence of an organic compound that reduces luminescence that is not dependent on the presence of an analyte by at least about 10 fold, and that reduces luminescence that is dependent on the presence of an analyte by less than about 7 fold.

2. A method for increasing the sensitivity of a luminescent assay comprising carrying out the assay in the presence of an organic compound that reduces luminescence generated by luminogenic molecules not bound to an enzyme by at least about 10 fold, and that reduces the luminescence generated by luminogenic molecules bound to an enzyme by less than about 7 fold.

3. (Amended) A method for increasing the sensitivity of a bio-luminescent assay comprising carrying out the assay in the presence of an organic compound that reduces autoluminescence by at least about 10 fold, and that reduces luminescence that is dependent on the presence of an analyte by less than about 7 fold.

4. The method of any one of claims 1-3 wherein the luminescent assay employs a luciferase, aequorin, or obelin enzyme.

5. The method of any one of claims 1-3 wherein the luminescent assay employs firefly luciferase.

6. The method of any one of claims 1-3 wherein the luminescent assay employs *Renilla* luciferase.

7. The method of any one of claims 1-3 wherein the luminescent assay employs *Cypridina* luciferase

8. The method of any one of claims 1-3 wherein the organic compound is present in a concentration of at least 0.1 μM.

9. The method of any one of claims 1-3 wherein the organic compound is present in a concentration of at least 0.1 mM.

10. The method of any one of claims 1-3 wherein the organic compound is present in a concentration of from about 0.1μM to about 500 mM.

11. The method of any one of claims 1-3 wherein the organic compound is present in a concentration of from about 100μM to about 100 mM.

12. The method of any one of claims 1-3 wherein the organic compound is present in a concentration of from about 10 mM to about 100 mM.

13. The method of any one of claims 1-3 wherein the assay is performed in the presence of whole cells.

14. The method of any one of claims 1-3 wherein the assay is carried out in a solvent comprising at least about 10% water by weight.

15. (Amended) The method of any one of claims 1-3 wherein the assay is carried out in a solvent comprising at least about 25% water by weight.

16. The method of claim 1 wherein the luminescence that is dependent on the presence of an analyte is reduced by less than about 5 fold.

17. The method of claim 2 wherein the luminescence generated by luminogenic molecules bound to an enzyme is reduced by less than about 5 fold.

18. The method of claim 3 wherein the luminescence that is dependent on the presence of an analyte is reduced by less than about 5 fold.

19. The method of claim 1 wherein the luminescence that is dependent on the presence of an analyte is reduced by less than about 2 fold, remains the same, or is increased.

20. The method of claim 2 wherein the luminescence generated by luminogenic molecules bound to an enzyme is reduced by less than about 2 fold, remains the same, or is increased.

21. The method of claim 3 wherein the luminescence that is dependent on the presence of an analyte is reduced by less than about 2 fold, remains the same, or is increased.

22. An assay kit comprising packaging material containing 1) a luminogenic substrate of a luminescent enzyme, or a luminogenic enzyme; and 2) an organic compound for reducing luminescence that is not dependent on the presence of an analyte by at least about 10 fold, and for reducing luminescence that is dependent on the presence of an analyte by less than about 7 fold.

23. An assay kit comprising packaging material containing 1) a luminogenic substrate of a luminescent enzyme, or a luminogenic enzyme; and 2) an organic compound for reducing luminescence generated by luminogenic molecules not bound to an enzyme by at least about 10 fold, and for reducing luminescence generated by luminogenic molecules bound to an enzyme by

less than about 7 fold.

24. An assay kit comprising packaging material containing 1) a luminogenic substrate of a luminescent enzyme, or a luminogenic enzyme; and 2) an organic compound for reducing autoluminescence by at least about 10 fold, and for reducing luminescence that is dependent on the presence of an analyte by less than about 7 fold.

25. The kit of any one of claims 22-24 wherein the enzyme substrate and the compound are each contained in a separate container

26. The kit of any one of claims 22-24 wherein the enzyme substrate and the compound are contained in a single container.

27. The kit of any one of claims 22-24 further comprising a buffer solution suitable for use in a luminescent assay.

28. The kit of claim 27 wherein the enzyme substrate and the buffer solution are contained in a single container.

29. The kit of claim 27 wherein the compound and the buffer solution are contained in a single container.

30. The kit of any one of claims 22-24 further comprising a substrate for a second luminescent enzyme.

31. The kit of any one of claims 22-24 further comprising a quenching agent for a luminescent enzyme reaction.

32. The kit of any one of claims 22-24 wherein the substrate is a substrate for firefly luciferase or *Renilla* luciferase.

33. The kit of any one of claims 22-24 further comprising ATP.

34. The kit of any one of claims 22-24 that comprises both a luminogenic substrate of a luminescent enzyme, and a luminogenic enzyme.

35. (NEW) A method for increasing the sensitivity of a bio-luminescent assay comprising carrying out the assay in the presence of an organic compound that reduces the luminescence that does not result from a bio-luminescent reaction by at least about 10 fold, and that reduces luminescence that does result from a bio-luminescent reaction by less than about 7 fold.

36. (NEW) The method of claim 1 wherein the luminescence that is dependent on the presence of an analyte is maintained or increases.

37. (NEW) The method of claim 2 wherein the luminescence generated by luminogenic molecules bound to an enzyme is maintained or increases.

38. (NEW) The method of claim 3 wherein the luminescence that is dependent on the presence of an analyte is maintained or increases.

39.(NEW) The method of claim 35 wherein the luminescence that results from a bio-luminescent reaction is maintained or increases.

40.(NEW) The method of claim 1 wherein the luminescence that is not dependent on the

presence of an analyte is chemi-luminescence that does not result from a bio-luminescent reaction.

41.(NEW) The method of claim 1 wherein the luminescence that is dependent on the presence of an analyte comprises luminescence generated within a living cell.

42.(NEW) The method of claim 2 wherein the luminescence generated by luminogenic molecules bound to an enzyme comprises luminescence generated within a living cell.

43.(NEW) The method of claim 3 wherein the luminescence that is dependent on the presence of an analyte comprises luminescence generated within a living cell.

44.(NEW) The method of claim 35 wherein the luminescence that does not result from a bio-luminescent reaction comprises luminescence generated within a living cell.

45.(NEW) The method of claim 1 wherein luminescence that is not dependent on the presence of an analyte comprises luminescence generated by a chemical reaction of coelenterazine or a functional analog thereof.

46.(NEW) The method of claim 2 wherein the luminescence generated by luminogenic molecules not bound to an enzyme comprises luminescence generated by a chemical reaction of coelenterazine or a functional analog thereof.

47.(NEW) The method of claim 3 wherein the auto luminescence comprises luminescence generated by a chemical reaction of coelenterazine or a functional analog thereof.

48.(NEW) The method of claim 35 wherein the luminescence that does not result from a bio-

luminescent reaction comprises luminescence generated by a chemical reaction of coelenterazine or a functional analog thereof.

49.(NEW) An assay kit comprising packaging material containing 1) a luminogenic substrate of an enzyme, or a luminogenic enzyme; and 2) an organic compound for reducing luminescence that does not result from a bio-luminescent reaction by at least about 10 fold, and that reduces luminescence does result from a bio-luminescent reaction by less than about 7 fold.

50. (NEW) The assay kit of claim 22 wherein the luminescence that is dependent on the presence of an analyte is maintained or increases.

51. (NEW) The assay kit of claim 23 wherein the luminescence generated by luminogenic molecules bound to an enzyme is maintained or increases.

52. (NEW) The assay kit of claim 24 wherein the luminescence that is dependent on the presence of an analyte is maintained or increases.

53.(NEW) The assay kit of claim 49 wherein the luminescence that results from a bio-luminescent reaction is maintained or increases.

54.(NEW) The assay kit of claim 22 wherein the luminescence that is dependent on the presence of an analyte comprises luminescence generated within a living cell.

55.(NEW) The assay kit of claim 23 wherein the luminescence generated by luminogenic molecules bound to an enzyme comprises luminescence generated within a living cell.

56.(NEW) The assay kit of claim 24 wherein the luminescence that is dependent on the presence

of an analyte comprises luminescence generated within a living cell.

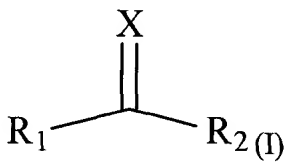
57.(NEW) The assay kit of claim 49 wherein the luminescence that does not result from a bio-luminescent reaction comprises luminescence generated within a living cell.

58. (NEW) The method of any one of claims 1, 2, 3, and 35 wherein the organic compound comprises a sulfur atom or a selenium atom.

59. (NEW) The method of any one of claims 1, 2, 3, and 35 wherein the organic compound contains a carbon-sulfur double bond (C=S).

60. (NEW) The method of any one of claims 1, 2, 3, and 35 wherein the organic compound contains a carbon-selenium double bond (C=Se).

61. (NEW) The method of any one of claims 1, 2, 3, and 35 wherein the organic compound is a compound of formula (I):



(I)

wherein X is S or Se; R_1 and R_2 are each independently hydrogen, (C_1-C_{20})alkyl, (C_3-C_8)cycloalkyl, (C_1-C_{20})alkoxy, (C_2-C_{20})alkenyl, (C_2-C_{20})alkynyl, aryl, heteroaryl, or NR_aR_b; or R_1 and R_2 together with the carbon to which they are attached form a 5, 6, 7, or 8 membered saturated or unsaturated ring comprising carbon and optionally comprising 1, 2, or 3 heteroatoms selected from oxy (-O-), thio (-S-), or nitrogen (-NR_c)-, wherein said ring is optionally substituted with 1, 2, or 3 halo, hydroxy, oxo, thioxo, carboxy, (C_1-C_{20})alkyl, (C_3-C_8)cycloalkyl, (C_1-

C_{20})alkoxy, (C_1-C_{20})alkanoyl, (C_1-C_{20})alkoxycarbonyl, (C_2-C_{20})alkenyl, (C_2-C_{20})alkynyl, aryl, or heteroaryl; and R_a, R_b and R_c are each independently hydrogen, (C_1-C_{20})alkyl, (C_3-C_8)cycloalkyl,(C_2-C_{20})alkenyl, (C_1-C_{20})alkanoyl, (C_1-C_{20})alkoxycarbonyl, (C_2-C_{20})alkynyl, aryl, heteroaryl; wherein any (C_1-C_{20})alkyl, (C_3-C_8)cycloalkyl, (C_1-C_{20})alkoxy, (C_2-C_{20})alkenyl (C_1-C_{20})alkanoyl, (C_1-C_{20})alkoxycarbonyl, or (C_2-C_{20})alkynyl of R_1 , R_2 , R_a, R_b, and R_c is optionally substituted with one or more halo, hydroxy, mercapto, oxo, thioxo, carboxy, (C_1-C_{20})alkanoyl, (C_1-C_{20})alkoxycarbonyl, aryl, or heteroaryl; and wherein any aryl or heteroaryl is optionally substituted with one or more halo, hydroxy, mercapto, carboxy, cyano, nitro, trifluoromethyl, trifluoromethoxy, (C_1-C_{20})alkanoyl, (C_1-C_{20})alkanoyloxy, sulfo or (C_1-C_{20})alkoxycarbonyl; or a salt thereof.

62. (NEW) The method of any one of claims 1, 2, 3, and 35 wherein the organic compound is a compound of formula R_3SH wherein R_3 is (C_1-C_{20})alkyl, (C_3-C_8)cycloalkyl,(C_2-C_{20})alkenyl, (C_2-C_{20})alkynyl, aryl, or heteroaryl; wherein any (C_1-C_{20})alkyl, (C_3-C_8)cycloalkyl, (C_2-C_{20})alkenyl, or (C_2-C_{20})alkynyl of R_3 is optionally substituted with one or more halo, hydroxy, mercapto oxo, thioxo, carboxy, (C_1-C_{20})alkanoyl, (C_1-C_{20})alkoxycarbonyl, aryl, heteroaryl, or NR_dR_e; wherein R_d and R_e are each independently hydrogen, (C_1-C_{20})alkyl, (C_3-C_8)cycloalkyl,(C_2-C_{20})alkenyl, (C_2-C_{20})alkynyl, (C_1-C_{20})alkanoyl, (C_1-C_{20})alkoxycarbonyl, aryl, or heteroaryl; and wherein any aryl or heteroaryl is optionally substituted with one or more (1, 2, 3, or 4) halo, mercapto, hydroxy, oxo, carboxy, cyano, nitro, trifluoromethyl, trifluoromethoxy, (C_1-C_{20})alkanoyl, (C_1-C_{20})alkanoyloxy, sulfo or (C_1-C_{20})alkoxycarbonyl; or a salt thereof.

63. (NEW) The method of any one of claims 1, 2, 3, and 35 wherein the organic compound is a compound of formula R_4NCS wherein: R_4 is (C_1-C_{20})alkyl, (C_3-C_8)cycloalkyl,(C_2-C_{20})alkenyl, (C_2-C_{20})alkynyl, aryl, or heteroaryl; wherein any (C_1-C_{20})alkyl, (C_3-C_8)cycloalkyl, (C_2-C_{20})alkenyl, or (C_2-C_{20})alkynyl of R_4 is optionally substituted with one or more halo, hydroxy, mercapto, oxo, thioxo, carboxy, (C_1-C_{20})alkanoyl, (C_1-C_{20})alkoxycarbonyl, aryl, heteroaryl, or

NR_fR_g; wherein R_f and R_g are each independently hydrogen, $(C_1$-$C_{20})$alkyl, $(C_3$-$C_8)$cycloalkyl,$(C_2$-$C_{20})$alkenyl, $(C_2$-$C_{20})$alkynyl, $(C_1$-$C_{20})$alkanoyl, $(C_1$-$C_{20})$alkoxycarbonyl, aryl, or heteroaryl; and wherein any aryl or heteroaryl is optionally substituted with one or more (1, 2, 3, or 4) halo, mercapto, hydroxy, oxo, carboxy, cyano, nitro, trifluoromethyl, trifluoromethoxy, $(C_1$-$C_{20})$alkanoyl, $(C_1$-$C_{20})$alkanoyloxy, sulfo or $(C_1$-$C_{20})$alkoxycarbonyl; or a salt thereof.

64. (NEW) The method of any one of claims 1, 2, 3, and 35 wherein the organic compound is a compound of formula R_5-X-R_6 wherein:

X is -S- or -Se-;

R_5 is $(C_1$-$C_{20})$alkyl, $(C_3$-$C_8)$cycloalkyl,$(C_2$-$C_{20})$alkenyl, $(C_2$-$C_{20})$alkynyl, aryl, or heteroaryl; and R_6 is hydrogen, $(C_1$-$C_{20})$alkyl, $(C_3$-$C_8)$cycloalkyl,$(C_2$-$C_{20})$alkenyl, $(C_2$-$C_{20})$alkynyl, aryl, or heteroaryl;

or R_5 and R_6 together with X form a heteroaryl;

wherein any $(C_1$-$C_{20})$alkyl, $(C_3$-$C_8)$cycloalkyl, $(C_2$-$C_{20})$alkenyl, or $(C_2$-$C_{20})$alkynyl of R_5 or R_6 is optionally substituted with one or more halo, hydroxy, mercapto, oxo, thioxo, carboxy, $(C_1$-$C_{20})$alkanoyl, $(C_1$-$C_{20})$alkoxycarbonyl, aryl, heteroaryl, or NR_kR_m;

wherein R_k and R_m are each independently hydrogen, $(C_1$-$C_{20})$alkyl, $(C_3$-$C_8)$cycloalkyl,$(C_2$-$C_{20})$alkenyl, $(C_2$-$C_{20})$alkynyl, $(C_1$-$C_{20})$alkanoyl, $(C_1$-$C_{20})$alkoxycarbonyl, aryl, or heteroaryl; and

wherein any aryl or heteroaryl is optionally substituted with one or more halo, mercapto, hydroxy, oxo, carboxy, cyano, nitro, trifluoromethyl, trifluoromethoxy, $(C_1$-$C_{20})$alkanoyl, $(C_1$-$C_{20})$alkanoyloxy, sulfo or $(C_1$-$C_{20})$alkoxycarbonyl; or a salt thereof.

65. (NEW) The method of any one of claims 1, 2, 3, and 35 wherein the organic compound is a compound of any one of formulae 1-11 of Figure 4.

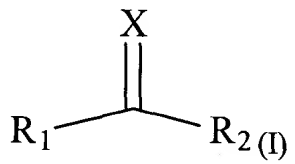
66. (NEW) The method of any one of claims 1, 2, 3, and 35 wherein the organic compound is a compound of formulae 1, 2, 4, or 6 as shown in Figure 4.

67. (NEW) The kit of any one of claims 22, 23, 24, and 49 wherein the organic compound comprises a sulfur atom or a selenium atom.

68. (NEW) The kit of any one of claims 22, 23, 24, and 49 wherein the organic compound contains a carbon-sulfur double bond (C=S).

69. (NEW) The kit of any one of claims 22, 23, 24, and 49 wherein the organic compound contains a carbon-selenium double bond (C=Se).

70. (NEW) The kit of any one of claims 22, 23, 24, and 49 wherein the organic compound is a compound of
formula (I):



(I)

wherein X is S or Se; R_1 and R_2 are each independently hydrogen, (C_1-C_{20})alkyl, (C_3-C_8)cycloalkyl, (C_1-C_{20})alkoxy, (C_2-C_{20})alkenyl, (C_2-C_{20})alkynyl, aryl, heteroaryl, or NR_aR_b; or R_1 and R_2 together with the carbon to which they are attached form a 5, 6, 7, or 8 membered saturated or unsaturated ring comprising carbon and optionally comprising 1, 2, or 3 heteroatoms selected from oxy (-O-), thio (-S-), or nitrogen (-NR_c)-, wherein said ring is optionally substituted with 1, 2, or 3 halo, hydroxy, oxo, thioxo, carboxy, (C_1-C_{20})alkyl, (C_3-C_8)cycloalkyl, (C_1-C_{20})alkoxy, (C_1-C_{20})alkanoyl, (C_1-C_{20})alkoxycarbonyl, (C_2-C_{20})alkenyl, (C_2-C_{20})alkynyl, aryl, or

heteroaryl; and R_a, R_b and R_c are each independently hydrogen, $(C_1$-$C_{20})$alkyl, $(C_3$-$C_8)$cycloalkyl,$(C_2$-$C_{20})$alkenyl, $(C_1$-$C_{20})$alkanoyl, $(C_1$-$C_{20})$alkoxycarbonyl, $(C_2$-$C_{20})$alkynyl, aryl, heteroaryl; wherein any $(C_1$-$C_{20})$alkyl, $(C_3$-$C_8)$cycloalkyl, $(C_1$-$C_{20})$alkoxy, $(C_2$-$C_{20})$alkenyl $(C_1$-$C_{20})$alkanoyl, $(C_1$-$C_{20})$alkoxycarbonyl, or $(C_2$-$C_{20})$alkynyl of R_1 , R_2 , R_a, R_b, and R_c is optionally substituted with one or more halo, hydroxy, mercapto, oxo, thioxo, carboxy, $(C_1$-$C_{20})$alkanoyl, $(C_1$-$C_{20})$alkoxycarbonyl, aryl, or heteroaryl; and wherein any aryl or heteroaryl is optionally substituted with one or more halo, hydroxy, mercapto, carboxy, cyano, nitro, trifluoromethyl, trifluoromethoxy, $(C_1$-$C_{20})$alkanoyl, $(C_1$-$C_{20})$alkanoyloxy, sulfo or $(C_1$-$C_{20})$alkoxycarbonyl; or a salt thereof.

71. (NEW) The kit of any one of claims 22, 23, 24, and 49 wherein the organic compound is a compound of formula R_3SH wherein R_3 is $(C_1$-$C_{20})$alkyl, $(C_3$-$C_8)$cycloalkyl,$(C_2$-$C_{20})$alkenyl, $(C_2$-$C_{20})$alkynyl, aryl, or heteroaryl; wherein any $(C_1$-$C_{20})$alkyl, $(C_3$-$C_8)$cycloalkyl, $(C_2$-$C_{20})$alkenyl, or $(C_2$-$C_{20})$alkynyl of R_3 is optionally substituted with one or more halo, hydroxy, mercapto, oxo, thioxo, carboxy, $(C_1$-$C_{20})$alkanoyl, $(C_1$-$C_{20})$alkoxycarbonyl, aryl, heteroaryl, or NR_dR_e; wherein R_d and R_e are each independently hydrogen, $(C_1$-$C_{20})$alkyl, $(C_3$-$C_8)$cycloalkyl,$(C_2$-$C_{20})$alkenyl, $(C_2$-$C_{20})$alkynyl, $(C_1$-$C_{20})$alkanoyl, $(C_1$-$C_{20})$alkoxycarbonyl, aryl, or heteroaryl; and wherein any aryl or heteroaryl is optionally substituted with one or more (1, 2, 3, or 4) halo, mercapto, hydroxy, oxo, carboxy, cyano, nitro, trifluoromethyl, trifluoromethoxy, $(C_1$-$C_{20})$alkanoyl, $(C_1$-$C_{20})$alkanoyloxy, sulfo or $(C_1$-$C_{20})$alkoxycarbonyl; or a salt thereof.

72. (NEW) The kit of any one of claims 22, 23, 24, and 49 wherein the organic compound is a compound of formula R_4NCS wherein: R_4 is $(C_1$-$C_{20})$alkyl, $(C_3$-$C_8)$cycloalkyl,$(C_2$-$C_{20})$alkenyl, $(C_2$-$C_{20})$alkynyl, aryl, or heteroaryl; wherein any $(C_1$-$C_{20})$alkyl, $(C_3$-$C_8)$cycloalkyl, $(C_2$-$C_{20})$alkenyl, or $(C_2$-$C_{20})$alkynyl of R_3 is optionally substituted with one or more halo, hydroxy, mercapto oxo, thioxo, carboxy, $(C_1$-$C_{20})$alkanoyl, $(C_1$-$C_{20})$alkoxycarbonyl, aryl, heteroaryl, or NR_fR_g; wherein R_f and R_g are each independently hydrogen, $(C_1$-$C_{20})$alkyl, $(C_3$-$C_8)$cycloalkyl,$(C_2$-

C_{20})alkenyl, (C_2-C_{20})alkynyl, (C_1-C_{20})alkanoyl, (C_1-C_{20})alkoxycarbonyl aryl, or heteroaryl; and wherein any aryl or heteroaryl is optionally substituted with one or more (1, 2, 3, or 4) halo, mercapto, hydroxy, oxo, carboxy, cyano, nitro, trifluoromethyl, trifluoromethoxy, (C_1-C_{20})alkanoyl, (C_1-C_{20})alkanoyloxy, sulfo or (C_1-C_{20})alkoxycarbonyl; or a salt thereof.

73. (NEW) The kit of any one of claims 22, 23, 24, and 49 wherein the organic compound is a compound of formula R_5-X-R_6 wherein:

X is -S- or -Se-;

R_5 is (C_1-C_{20})alkyl, (C_3-C_8)cycloalkyl,(C_2-C_{20})alkenyl, (C_2-C_{20})alkynyl, aryl, or heteroaryl; and R_6 is hydrogen, (C_1-C_{20})alkyl, (C_3-C_8)cycloalkyl,(C_2-C_{20})alkenyl, (C_2-C_{20})alkynyl, aryl, or heteroaryl;

or R_5 and R_6 together with X form a heteroaryl;

wherein any (C_1-C_{20})alkyl, (C_3-C_8)cycloalkyl, (C_2-C_{20})alkenyl, or (C_2-C_{20})alkynyl of R_5 or R_6 is optionally substituted with one or more halo, hydroxy, mercapto, oxo, thioxo, carboxy, (C_1-C_{20})alkanoyl, (C_1-C_{20})alkoxycarbonyl, aryl, heteroaryl, or NR_kR_m;

wherein R_k and R_m are each independently hydrogen, (C_1-C_{20})alkyl, (C_3-C_8)cycloalkyl,(C_2-C_{20})alkenyl, (C_2-C_{20})alkynyl, (C_1-C_{20})alkanoyl, (C_1-C_{20})alkoxycarbonyl, aryl, or heteroaryl; and

wherein any aryl or heteroaryl is optionally substituted with one or more halo, mercapto, hydroxy, oxo, carboxy, cyano, nitro, trifluoromethyl, trifluoromethoxy, (C_1-C_{20})alkanoyl, (C_1-C_{20})alkanoyloxy, sulfo or (C_1-C_{20})alkoxycarbonyl; or a salt thereof.

74. (NEW) The kit of any one of claims 22, 23, 24, and 49 wherein the organic compound is a compound of any one of formulae 1-11 as shown in Figure 4.

75. (NEW) The kit of any one of claims 22, 23, 24, and 49 wherein the organic compound is a compound of formula 1, 2, 4, or 6 as shown in Figure 4.